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ABSTRACT

Pennsylvania State University provided financial grants and support services to faculty members for improvement of instruction. Funds were provided for released time for faculty, audiovisual production materials, and research and evaluation. An extension course in business logistics was developed using these funds. Lecture presentations were prepared on videotape and student and faculty manuals, test banks, evaluation questionnaires, a guide for extra credit papers, and publicity materials were also developed. (CH)

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# "A Study In Instructional Design: A Multi-Modal Approach to Business Logistics"

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While many academic institutions have supported the rhetoric of instructional development few schools have supported the concent financially or logistically. The Pennsylvania State University through the Vice President for Undergraduate Instruction and the University Division of Instructional Services provides a once a year program of financial grants and a full range of production, evaluation, and distribution support services. These are directed at the improvement of instruction through systematic means and distribution. The financial grants support: released time payments for faculty, funds for production materials (video tapes, art supplies, photographic materials, etc.), and funds for research and evaluation expenses. The following is a descriptive study of a comprehensive instructional development effort conducted on an introductory course in business logistics (Penn State nomenclature B. Log. 102). The authors believe that this case study details the methods and benefits of a total instructional development effort.

## I. Rational for Course Development

### What Is Business Logistics

As defined in module 1 of the video portion of Business Logistics 102, business logistics is: "the study of the physical movement of goods from supply points to points of purchase and the associated transfer and holding of such goods at various storage points."

During the course the student will study: the financial aspects of inventory, warehousing and materials handling equipment, modes of transportation, rates and rate structures, location decisions, and systems concepts for business.

Many institutions of business administration teach this content material under course headings other than business logistics. Segments of this content material have been taught in management courses, managerial marketing courses, and in transportation courses. Penn State is rather unique in that is has gathered the majority of this material together in the Department of Business Logistics.

### What Is An Instructional Specialist

The College of Business Administration at Penn State supports the concepts of instructional development and improvement by employing an instructional specialist in the College. The Specialist is a regular member of the University Faculty and is directly answerable to the Associate Dean of the College. This specialist acts as a liaison between the teaching faculty of the College and the instructional production staff at the University. He is charged with specific duties

of developing and altering content material to fit the technological medium, developing instructional materials that a student can interact with, and conducting and interpreting evaluation programs.

Why Business Logistics 102

There are a number of reasons why Business Logistics 102 became a case study for successful instructional development and improvement. The factors, which in the authors' opinions contributed to this success appear to be:

1. Business Logistics never was a poor course (i.e. the course never suffered from a poor instructor or improper content)

Business Logistics 102 suffered from problems common to many courses in professional, career oriented instructional programs today. Courses of this type are typically over enrolled and not adequately staffed. As an example, Business Logistics 102 has approximately 350 students enrolled in the course each term, and is taught by one faculty member. This kind of instructional arrangement is not conductive to creating a program that is easily adaptable to individual student differences. Business Logistics 102 needed a method of reaching students at the upper and lower ranges of the student course distribution.

2. Business Logistics 102 could make very good use of additional visual examples.

Prior to redesign of Business Logistics 102 was taught by using the lecture method interspersed with 2x2 inch color slides in a traditional classroom. These slides were used to show various types of transportation equipment such as trucks and specialized railroad cars, materials handling equipment, and other equipment and production and distribution situations that could be visualized. Lacking from the lecture presentations were charts, diagrams or models which assist the explanation of a concept, films of equipment in operation, and other complex visuals.

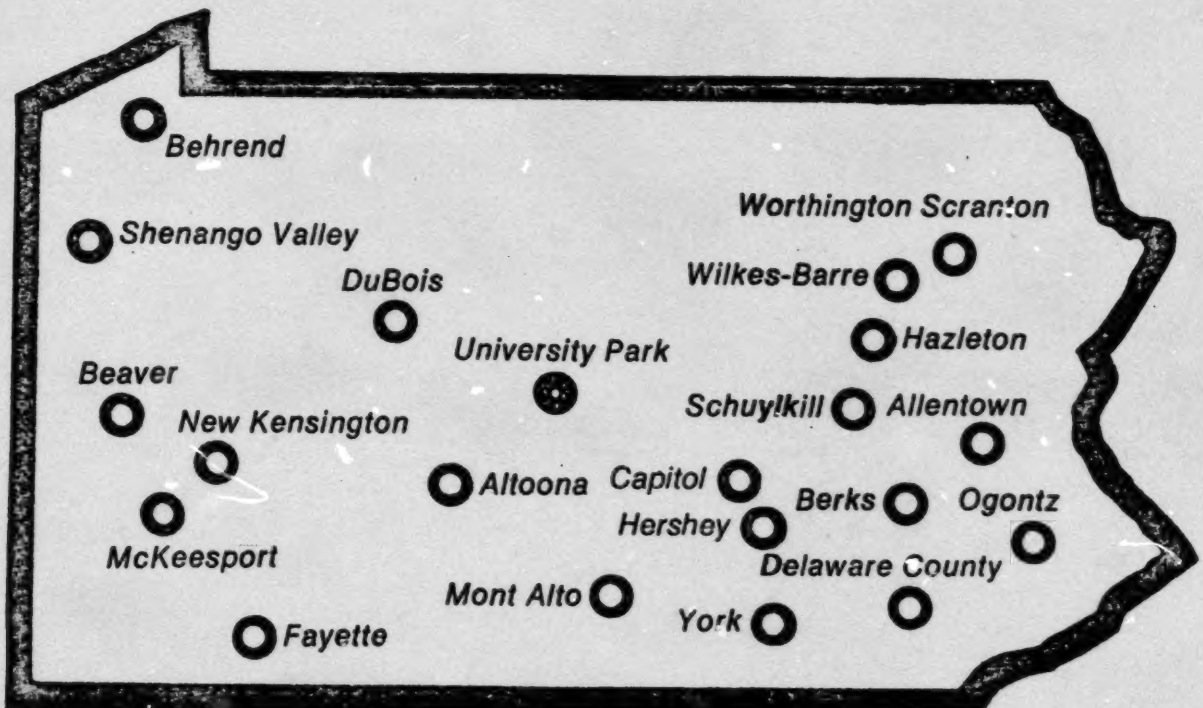
3. The content specialists for Business Logistics 102 had all but completed writing a new textbook.

Obviously it is not possible to begin an instructional improvement project after having completed a new textbook. This was an ideal situation. This development project greatly benefited from the advance thought which came from writing the textbook (Management of Logistics Systems, John J. Coyle and Edward J. Bardi.) Our experience indicates that the most difficult step in an instructional development project

is organizing content to form an agreeded on and teachable subject matter. This step was particularly difficult in business logistics because there are very few programs to model from in the United States. With the organization of the content well along as a result of the new textbook, the development team could go directly into the design and production of the instructional modules with only minor refinements necessary to develop specific module objectives.

4. Very few business administration courses are portable enough to be offered away from the main campus of the University.

The Pennsylvania State University actually consists of twenty two campuses of varying size, enrollment and mission of which the University Park campus is the largest. The University has adopted the philosophy of the Pennsylvania State University as one university geographically dispersed. The College of Business Administration at Penn State employs a number of faculty members at the Commonwealth Campuses however these faculty typically teach a wide variety of business subjects including accounting, marketing, management, etc. With this type of diversity mose campus faculty could not be expected to teach a non traditional course like business logistics. Additionally, campus faculty have proven to be receptive to any type technological aid which has the potential for relieving class preparation procedures from them. Preliminary indications suggested that the Commonwealth Campus faculty would be very happy to have course materials for Business Logistics 102 which they could use in a technological format.



5. Business Logistics is considered a senior level course for most Business Administration students.

The curriculum of the College of Business Administration is set up in tiers or levels and most students find it convenient to follow this pattern in taking required courses.

TABLE 1
SUGGESTED COURSE SEQUENCE
COLLEGE OF BUSINESS ADMINISTRATION, P.S.U.

| | |
|---|---|
| 1st level | Accounting 101 and 102<br>Quantitative Business Analysis 101 and 102 |
| 2nd level | Business Logistics 102 or Insurance and Real Estate 100<br>Finance 105<br>Management 110<br>Marketing 122 |
| 3rd level | Courses in specialty area |
| 4th level | Business Policy 330 |

The framework, however, is very flexible and it should be noted that Business Logistics is an option course under this framework. If a student found they could not enroll in Logistics for any reason, they could meet their general requirements by taking Insurance and Real Estate 100. Additionally, if a student did not investigate the possible majors available in the College, or opted for a more traditional major the student could defer business logistics until his senior year. By making Business Logistics 102 available to students in different modes, the course could be offered to students at any time in their academic programs. By waiting until their senior year many students were never aware of this exciting field.

6. The faculty in the department of Business Logistics wanted the course to be successful.

In what was quite possibly the most important single aspect of this successful project, the faculty of the department of business logistics were commited to improving Business Logistics 102. The faculty members were aware of the potential advantages for the students enrolled in Business Logistics 102 if they could improve aspects of the course and they were aware of the personal advantages to themselves. If a technology could be used to reduce their day to day commitment to the course this would permit the faculty more time to teach advanced courses in business logistics or to intensify aspects of the basic course that were exciting.

## II. Product Strategy

During the early stages of the Instructional Improvement Grant, a production specialist was assigned from the University Division of Instructional Services. The production specialist was primarily responsible for the adaptation, design and production of the content material to the television medium. Significant to this project was the development of a stragety for the effective and efficient management of a product design and product development.

### Product Design

The discussion of product design was a predominate consideration in the developmental stages of Business Logistics 102. Design input was linear in nature containing various steps followed for all instructional lessons.

The first contact which development faculty have with the production staff and facilities is considered an all important one. All efforts are made to reduce the natural anxiety a faculty member experiences during a first developmental project. An initial meeting included a review and modification of the original project proposal, at which time an analysis of the department's needs, learner's needs, and faculty's needs was made.

Two committees were formed during the Improvement Grant's duration, they were: an advisory committee, which was accountable for the investment of staff, time, and finances; and a development committee which was responsible for the design and production of the product.

After initial committee meetings and further analysis of content and purpose, the faculty member was acquainted with production facilities, capacities, services and various possible teaching strategies. Sample instructional packages were viewed and discussed. A course of action was then initiated which included: a determination and refinement of course objectives; an elaboration of course content; a listing of production techniques; a determination of duplication and dissemination systems; and a listing of possible utilization and maintenance considerations. With this initial product design input, a tentative timetable and proposed formative and summative evaluation techniques were developed.

By classroom observation, a television teaching style and method was prescribed for the faculty member; the style was a blend of learning theory and research with practical considerations for the medium utilized. A pilot lesson was produced giving the faculty member an opportunity to build self-confidence and an opportunity for self-criticism. Evaluation and interpretation of pilot data instruments gave further input during the formative development of Business Logistics 102. At this point, the advisory and development committees reassessed the development, design, and production procedures recommending a final product development strategy.

Product Development

The design input stage acclimated the faculty member to a systematic approach to the development of instruction; in actuality the process served as an in-service technique to acquaint faculty to present instructional methodology. With the design stage and pilot videotape complete the development of the final product was simplified.

A course symbol and logo were designed to add identification and consistency to all materials produced. For each lesson developed an abbreviated design process was utilized, modeled after the initial design input stage. In addition to the input process, the following three concurrent considerations were ongoing for the final specification of teaching method and materials:

A. Production Resources

Always in mind is the wide variety of resources available at Penn State in both staff and facilities. Resources include television services, listening-learning services, graphic services, motion picture services, photography services, evaluation services, equipment services, film library services, and distribution and maintenance services. These services each have facilities and professional staff to aid in the development and production of the final packaged product. Other resources include the university libraries, music libraries, learning resource centers, and the various facilities and faculty of specific academic departments. Extensive slide banks exist in both individual and department collections. Outside resources included corporate contributions, (both money and material) and local community business support.

B. Production Techniques

Techniques utilized integrated aspects of learning theory, research, and visual design theory into a motivating final product. Techniques and strategies employed included use of outline scripts, live talent, the visual display of objectives and varied display of slides, graphics, and film. Slides were realistic, or were of graphics which were at times animated via cross cutting in a slide/film chain. Graphics were specifically designed to be clear, simplified, and at times color coded for the concepts being presented. A character generator was also utilized to emphasize key concepts visually. Three dimensional models and live graphic charts were also employed to facilitate attentiveness to the visualized content.

A variety of dramatized situations, case studies, set designs, humor, chromakey, demonstrations, film and problems were used to increase the interest of the televised material. Supplementary videotapes were

designed so students could receive additional branching instruction at difficult content areas. The first videotape in the course (Module 1) was produced last to enhance the opportunity to use the many learning materials developed throughout the course. In addition to the televised materials, coordinated supplementary materials were designed to be included in faculty manuals and student manuals.

C. Production Staff Interaction

A linear management procedure was used for each script whereby an initial explanation of the lesson's content occurs, followed by a creative brainstorming session; presentation method and visualization were then planned. A second meeting refined the presentation style and visualized techniques, whereafter visuals were designed and visual resources located and duplicated. The third meeting included the rehersal and actual recording of the instruction; after recording, the video lesson was critiqued and visual revisions or additions cited. Finally, revision or additions of visual material to the videotape completed the lesson product.

Product Package

Upon completion of the production stage for Business Logistics 102, the product package consisted of:

1. Twenty-four videotaped units: Twenty main video lessons with four supplementary branching video lessons. Running time for each main video lesson was between forty and sixty minutes.
2. Complementing audio tapes of all units.
3. Student manual and textbook.
4. Faculty manual.
5. Cognitive achievement test bank.
6. Demographic Questionnaire, Attitude Questionnaire, and an Objective Content Instrument.
7. A guide for alternative extra credit papers.
8. Publicity materials.

III. Evaluation

Evaluation of the project has been an ongoing process since the initiation of the course improvement project. Three types of evaluation instruments were

used in the project which gave a complete picture of the operation of the course and are briefly described below.

Demographic Questionnaire

This thirty four item questionnaire was administered to all students enrolled in the course without regard to the mode in which they took the course. This questionnaire requested data on: audience background information, general course information, evaluation of course objectives, and evaluation of exams and grading procedure. Data derived from this questionnaire told the team information about the general needs and concerns of our audience and provided us with term by term comparisons on our efforts in the course.

Instructional Evaluation Form (IEF)

By administering this questionnaire the project team was able to position the course with other courses taught at Penn State. The I.E.F. (and an earlier version called the Course Attitude Questionnaire) had been in use at the University for several years and carries with it a complete package of norms by which student attitudes can be relatively compared. This measure, when used in conjunction with the previously mentioned attitudinal instrument formed a very complete package of information on how the students felt about the course.

Objective Content Instruments

These instruments were administered by the students when they completed each module of the course. The instruments were made possible because the course was divided into definable segments based on content objectives. The procedure was to have the student complete a questionnaire when he felt he had acquired the information or skill necessary to fulfill the stated objective. The questionnaire also provided space for the student to indicate if he met with any better success during a second study of the material.

After the student completed the questionnaire he checked how he had met the objective (class, videocassette, both). These questionnaires were then correlated with results from the objective examinations to determine if students were acquiring the course objectives to their anticipated level as well as to the level anticipated by the project team.

This type of evaluation proved very successful when attempting to identify where instructional problems are occurring. By using this form of module, the questionnaire identified several instructional problems on preliminary versions of the video cassettes.

Course Examinations

These instruments took the form of periodic examinations which took place during the term of the course. The examinations were based on the previously developed objectives for the course and could easily be correlated with the previously mentioned objective content instruments to determine if the students actually achieved the stated objectives.

## IV. Conclusion

In conclusion, the authors' feel the Business Logistics 102 project was a success by any measure. The team members have each added their expertise to this effort and it became a true labor of love. Further information on the project may be obtained from the authors.